

ABSTRACT

Large reservoirs of Heavy Oil have been discovered in the Alaskan Arctic, below a thick Permafrost zone. Others are located Offshore, in deep water, another cold environment. The very low temperature of those reservoirs greatly increases the Heavy Oil viscosity. In warmer environments, Steam Injection from the surface is the method of choice for economically recovering Heavy Oil. To be effective, wet Steam injection in Arctic wells or in deep Offshore wells, requires minimum heat losses through well tubulars carrying Steam or heated Heavy Oil. This is done by a combination of improvements in the Multi-lateral well configuration and patented process of Reference (1):

a) by using two dedicated and "super-insulated" vertical tubulars, co-axially carrying wet Steam, at the center, surrounded by Heated Oil, through the coldest part of their environment,

b) by maintaining almost un-changed the temperature of the co-axial outer casing, with a circulation of cold oil-lifting fluid,

c) by connecting a plurality of multi-lateral "quasi-horizontal" wells to the same two "super-insulated" vertical tubulars, by means of Downhole flow control Modular Systems, including 3-way valves, float valves and other Oil-lifting devices, so that each "quasi-horizontal" well may be sequentially switched, from the surface, from the cyclic Steam Injection mode to that of Oil Production, and vice versa,

d) by providing control means and easy access to logging or cleaning tools, from the surface to any one of the "quasi-horizontal" wells, during the life of the Multi-lateral well.